ADVANCES IN ENDOSCOPY

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Management of Benign Biliary Strictures

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G&H What are the main etiologies of benign biliary strictures?

MB Approximately 15% of biliary strictures in the Western world are benign, and there are multiple factors that contribute to stricture formation in the biliary tree. The most prevalent etiology of benign strictures by far is related to surgery; postoperative biliary strictures account for approximately 80% of cases of benign biliary strictures and usually involve an injury after gallbladder surgery, particularly when performed laparoscopically. Benign strictures can also be seen after liver transplantation, usually 3–6 months postsurgery. The second most prevalent etiology of benign strictures, which accounts for approximately 10% of cases, is pancreatitis along with its related complications. The remaining etiologies comprise an extensive list including inflammatory conditions such as primary sclerosing cholangitis, inflammation caused by bile duct stones, the side effects of radiation or chemotherapy, a variety of infectious causes including tuberculosis, various parasites, and viruses, as well as more varied causes such as direct or blunt trauma to the abdomen, Mirizzi syndrome with external compression from the gallbladder, and recurrent pyogenic cholangitis, formerly known as Oriental cholangiohepatitis. Nevertheless, we remain at odds with a small percentage of idiopathic strictures in which a clear etiology is never determined.

G&H Is treatment necessary in both symptomatic and asymptomatic patients with benign biliary strictures, and is preventative treatment needed?

MB Management of benign biliary strictures should be aimed at achieving patency of the bile duct or preserving that patency in an attempt to minimize any short- or long-term complications such as infection with cholangitis or more chronic changes such as secondary biliary cirrhosis. Traditionally, surgery has been used as a means to treat benign strictures, particularly if the stricture is postsurgical in nature, but endoscopy is increasingly used here. The initial treatment option depends upon the location, severity, and etiology of the stricture as well as the patient's overall health. If the patient is relatively or completely asymptomatic of their primary or underlying disease, they are often asymptomatic of their actual bile duct stricture until it narrows to the point of causing bile stasis. In particular, if patients with strictures in their bile ducts secondary to pancreatitis are asymptomatic, the treatment options are debatable. As it is generally agreed that there is a fairly low incidence of bile duct infection or secondary biliary cirrhosis in these patients, if they have asymptomatic strictures, it may be indicated not to pursue therapy that is overly aggressive. A wait-and-watch approach may be most effective in these patients.

G&H Could you expand on the efficacy and safety of the most common surgical treatment options in patients with benign biliary strictures?

MB Surgery has a long history of use in these patients. There are a variety of surgical approaches that have been used in the past and are still currently used, including hepaticojejunostomy and choledochojejunostomy using Roux jejunal loops. Anastomosis between the bile ducts and bowel provides a high long-term success rate in most cases. Occasionally, patients who have a stricture in their bile duct secondary to significant pancreatitis may require a more aggressive treatment such as a Whipple procedure

or a pancreaticoduodenectomy. Although the latter procedure is associated with high morbidity and mortality and is rather aggressive for managing a bile duct stricture, it is occasionally necessary. In addition, in patients with primary sclerosing cholangitis, it should be determined whether a more definitive treatment such as liver transplantation is required rather than repeated stenting or dilatation of strictures endoscopically.

G&H Could you discuss the short- and long-term outcomes and safety of the various types of stents in these patients?

MB Current study data suggest that, overall, the use of multiple plastic stents is a better approach than the use of a single plastic stent. The role of metal stents, particularly those that are covered and can be removed, is also being explored. These stents are the newest advances. The endoscopic era has witnessed fairly frequent treatment of benign strictures endoscopically. In the short term, the response to stents is quite good. More recent studies have shown that with more aggressive endoscopic therapy, long-term success may even be comparable to surgery and that it may be possible to reserve surgery only for patients in whom endoscopic treatment has failed. We have also moved on from single stent insertion in most cases to considering the insertion of at least 2 stents with or without balloon dilatation in advance. In theory, inserting multiple stents should increase the amount of dilatation obtained with the stricture and simultaneously reduce the risk of stent occlusion. A commonly cited study conducted by Costamagna and colleagues has shown this by looking into the effects of using multiple stents in 45 patients who had bile duct strictures after surgery. In this study, an increasing number of stents was placed over a 12–24-month period, and there was a success rate of over 90% in terms of bile duct patency at the end of the study. Some of these patients received up to 4 or 5 stents, and 1 or 2 patients received 6 stents. This study is frequently cited, and even though not many other studies have supported its findings as of yet, many physicians follow its recommendation of multiple stents.

Another evolving field is the use of metal stents. These stents have traditionally been used for malignant disease but are now being considered for benign disease, as they should offer improved patency and less occlusion compared to other stents. In this regard, they would be a better option than plastic stents. However, metal stents often become embedded in the wall of the bile ducts and can be difficult to remove; there have been several studies that have looked at the use of traditional metal stents for benign strictures and, overall, the results have not been outstanding. In fact, the overall conclusion was that traditional metal biliary stents should not be used for benign strictures in patients with a life expectancy beyond 2 years. Given that these stents do provide a greatly improved dilating force within the bile ducts, the appeal of metal stents remains quite strong and their investigation continues. We are also now considering newer covered removable stents, which can be removed even several months after placement, rather than the traditional noncovered metal stents.

Finally, another new possibility for treating benign biliary strictures may be bioabsorbable stents. There have been several studies in the pig model that have shown positive results, but further investigation is needed.

G&H What are the advantages of endoscopic stents over surgery?

MB The morbidity and mortality rates associated with endoscopy are much lower than those of surgery. Most studies suggest that for the majority of pathologies, endoscopy can be as effective as surgery, particularly in the short to medium term. Some of the more difficult ischemic or anastamotic strictures have been more challenging to treat endoscopically rather than surgically, but as physicians are now moving toward using a greater number of stents and different types of stents, that divide may be bridged as well. The movement away from surgery is becoming more common in these types of strictures, perhaps with the exception of patients who have difficult strictures after liver transplantation or those associated with chronic pancreatitis, which appear to be more resistant and often require the replacing of stents. Some physicians mistakenly assume that surgery remains the treatment of choice in all patients, even as alternatives such as therapeutic endoscopic retrograde cholangiopancreatography (ERCP) have improved their ability to deliver a good outcome with increasingly aggressive endoscopic therapy.

G&H Could you discuss any other commonly used endoscopic treatment options such as ERCP for the treatment of benign biliary strictures?

MB ERCP is a very effective procedure for delineating the site of stricture, as it has a high sensitivity and specificity. ERCP can also help in determining whether a stricture is benign or malignant. During ERCP, a sphincterotomy can be performed to aid stent placement and increase bile duct flow into the duodenum with or without performing balloon dilatation of the stricture. However, it has been shown that sphincterotomy and balloon dilatation alone are not effective enough for stricture management beyond the very short

term. In the vast majority of cases, it is necessary to balloon dilate and insert a stent as well. On occasion, percutaneous transhepatic cholangiography (PTC) can be used to aid in the diagnosis and treatment of bile duct strictures. This procedure is often useful in patients who have undergone surgery such as Roux-en-Y surgery or Billroth II gastrectomy, as ERCP often fails in these anatomies. In addition, PTC is often useful in patients who have difficult strictures at the hilum, where again ERCP can fail. PTC can be used to achieve drainage and stent placement as well.

G&H Are all patients candidates for endoscopic treatment, or do factors such as age or etiology of the stricture play a role in treatment choice?

MB The outcome, particularly of endoscopic management, very much depends upon the etiology and location of the stricture. Age clearly plays a role in treatment choice, as patients who have multiple comorbidities may not be suitable surgical candidates, leaving endoscopy as the only available option. However, patients who are very unwell may not be the best candidates for endoscopy either. This is not an easy question to answer, but I do not think that every patient needs treatment. Endoscopic management is more attractive, particularly in elderly patients, because of its less invasive nature, and significant advances have been recently made, as discussed above. The chosen endoscopic option depends upon the cause of the stricture to some degree. Strictures related to prior surgery are certainly worth treating endoscopically. A number of studies have examined this group of patients and demonstrated good patency at 1 year and no significant difference between surgery and endoscopy. As physicians move toward more aggressive endoscopy with a greater number of stents, as described above in the study by Costamagna and colleagues, I think that we will find that endoscopy may be even better than surgery. In patients who have chronic pancreatitis, even though endoscopic stent placement is often used in the beginning, longer-term results have traditionally been disappointing in this group, and patients have increasingly undergone surgery. Again, several studies have investigated the use of more than one stent in the hopes of increasing patency, though this question remains unanswered. In the other significant patient group of those who have strictures following liver transplantation, management is still evolving. Some studies have suggested that surgery is more effective than inserting a stent endoscopically in this group of patients, whereas more recent data have suggested relatively good success using balloon dilatation and stent placement. There are limited studies in these patient groups, but the treatment option does depend, to some degree, upon the type of stricture or the underlying cause of stricture.

Unfortunately, the role of the multidisciplinary approach is undervalued. Because of the diverse nature, presentation, and severity of benign strictures, the multidisciplinary approach incorporating the endoscopist, radiologist, and surgeon should be encouraged in most cases.

G&H Does medical treatment play any role as a secondary therapy?

MB The main role of medical treatment is to stabilize a patient and manage any complications that develop secondary to bile duct strictures, particularly until a more definitive therapy can be achieved. Of course, most patients who present with cholangitis must take antibiotic therapy and other supportive treatment. Particularly in the elderly patient in whom we do not want to intervene unless absolutely necessary, a significant number of patients may respond to this type of medical therapy and may not need urgent intervention. However, for treatment beyond the short term, either surgical or endoscopic therapy must be considered.

G&H Could you discuss the follow-up process for patients with benign biliary strictures?

MB Generally, patients who have benign strictures do well after undergoing endoscopic stenting or surgery, unlike, for example, patients who have malignant bile duct strictures. If strictures are undertreated or not treated at all, patients can develop secondary changes in the liver or biliary cirrhosis and may be at risk for developing repeated infections or even abscesses in the liver. Stones may also develop above the stricture due to bile stasis. Beyond this, when stents are inserted, patients must be aware of symptoms that herald partial obstruction in order to obtain a stent change as quickly as possible. Patients must liaise closely with their gastroenterologist if they underwent stent placement to determine the appropriate period of follow-up and stent change. Physicians vary in how often they change stents for benign disease. Some leave stents for 3 months to exchange them before occlusion, whereas others leave them longer, perhaps 6 months or longer, in the hope of reducing the number of procedures but continuing to maintain bile duct patency.

G&H What are the next steps for research in this area?

MB Ideally, the goal would be to improve the prevention of strictures by treating the underlying disease, which, as discussed above, involves many different causes that

depend upon the pathology. In terms of specific advances for treating established benign strictures, covered metal stents should be further examined to see whether they can be used as a short-term option that can be removed when the stricture has been significantly dilated. Bioabsorbable, self-expanding stents are another growing area of interest, as mentioned above. There has also been some very early and exciting work looking at retrievable biliary stent grafts in the treatment of benign strictures. We have had the ability to look directly within the bile ducts with cholangioscopy using mother and daughter ERCP scopes over the last few years, but these methods have had some difficulties. The increasing availability of the SpyGlass Direct Visualization System and other methods of cholangioscopy may increase our ability to examine these strictures and perhaps even apply local therapy.

Suggested Reading

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